

# INSTALLATION INSTRUCTIONS AND HOMEOWNER'S MANUAL: OIL FIRED FURNACE



## Models:

RHB-105 & RHB-140  
RLB-105 & RLB-140



### **INSTALLER / SERVICE TECHNICIAN:**

USE THE INFORMATION IN THIS MANUAL FOR THE  
INSTALLATION AND SERVICING OF THE FURNACE AND  
KEEP THE DOCUMENT NEAR THE FURNACE FOR  
FUTURE REFERENCE

### **HOMEOWNER**

PLEASE KEEP THIS MANUAL NEAR THE FURNACE  
FOR FUTURE REFERENCE.

### **Attention:**

Do not tamper the unit or its controls.  
Call a qualified service technician.

Manufactured by : Dettson Industries Inc.  
Sherbrooke, Qc, Canada  
[www.dettson.com](http://www.dettson.com)

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# 1 SAFETY

## 1.1 SAFETY LABELING AND WARNING SIGNS

The words **DANGER**, **WARNING** and **CAUTION** are used to identify the levels of seriousness of certain hazards. It is important that you understand their meaning. You will notice these words in the manual as follows:



**Immediate hazards which WILL result in death or serious bodily and/or material damage.**



**Hazards or unsafe practices which CAN result in death or serious bodily and /or material damage.**

### CAUTION

Hazards or unsafe practices which CAN result in minor bodily and /or material damage.

## 1.2 SAFETY INSTALLATION REQUIREMENTS



**Non-observance of the safety regulations outlined in this manual will potentially lead to consequences resulting in death, serious bodily injury and/or property damage.**



**For use with grade 2 fuel oil maximum. Do NOT use gasoline, crankcase oil or any oil containing gasoline.**



**Never burn garbage or paper in the heating system and never leave rags or paper around the unit.**

### CAUTION

These instructions are intended for the sole use of qualified personnel trained in installing this type of furnace. Installation of this furnace by an unqualified person can lead to hazardous conditions, resulting in bodily harm and/or equipment damage.

**IMPORTANT:** All local and national code requirements governing the installation of oil burning equipment, wiring and flue connections must be followed. Some of the codes that may be applicable are:

CSA B139 Installation Code for Oil Burning Equipment  
ANSI/NFPA 31 Installation of Oil Burning Equipment  
ANSI/NFPA 90B Warm Air Heating and Air Conditioning Systems  
ANSI/NFPA 211 Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances  
ANSI/NFPA 70 National Electrical Code  
CSA C22.2 No.3 Canadian Electrical Code

Only the latest issues of the above codes should be used, and are available from either:

The National Fire Protection Agency  
1 Batterymarch Park  
Quincy, MA 02269

or

The Canadian Standards Association  
178 Rexdale Blvd.  
Rexdale, Ontario M9W 1R3

### CAUTION

**ENVIRONMENTAL HAZARD** Failure to follow this caution may result in environmental pollution. Remove and recycle all components or materials (i.e. oil, electrical and electronic components, insulation, etc.) before unit final disposal.

## 2 INSTALLATION

### 2.1 SAFE INSTALLATION REQUIREMENTS

1. This furnace is NOT approved for installation in mobile homes, trailers or recreational vehicles
2. Do NOT use this furnace as a construction heater or to heat a building under construction;
3. Use only the type of fuel oil approved for this furnace. Overfiring will result in failure of heat exchanger and cause dangerous operating conditions;
4. Visually check all oil line joints for leaks;
5. There must be a sufficient supply of fresh air for combustion as well as ventilation in the area where the furnace is located;
6. Connect furnace to a side-wall terminal or chimney;
7. The points in Part 3 "Operation" are vital to the proper and safe operation of the heating system. Take the time to ensure that all steps were followed;
8. Follow the regulations of the NFPA Pamphlet No.31 (USA) and CSA B-139 (Canada) or local codes for placing and installing the oil storage tank;
9. Follow a regular service and maintenance schedule for efficient and safe operation;
10. Before servicing, allow furnace to cool. Always shut off electricity and fuel to furnace when servicing. This will prevent electrical shock or burns;
11. Seal supply and return air ducts;
12. The vent system MUST be checked to determine that it is the correct type and size;
13. Install correct filter type and size;
14. Unit MUST be installed so that electrical components are protected from direct contact with water.

#### NOTE

1. Be sure to level the furnace, using a spirit level on the front and one side. If the furnace is not level, oil can drip into the combustion chamber after burner cycling and contaminate the heat exchanger and the burner head.
2. Make sure all legs are in contact with the floor to distribute the load and prevent the possibility of undue noise or vibration.
3. Avoid locating return grills in rooms that may contain undesirable odors.

4. Never locate a return air grill closer than approximately 20 feet from the furnace.
5. Locate the furnace near the center of the supply and return duct systems.
6. Always check the size of the ducts on a replacement installation, particularly if adding air conditioning.

#### WARNING

**Installation or repairs performed by unqualified persons can result in hazards to them and others. Installation MUST conform to local codes or, in the absence of same, to codes of the country having jurisdiction. The information contained in this manual is intended for use by a qualified service technician familiar with safety procedures and equipped with the proper tools and test instruments. Failure to carefully read and follow all instructions in this manual can result in death, furnace malfunction and/or property damage.**

#### WARNING

**FIRED HAZARD The furnace must be installed in a level position, never where it will slope toward the front. If the furnace is not installed level, oil will drain into the furnace vestibule and create a fire hazard.**

#### CAUTION

It is the personal responsibility and obligation of the customer to contact a qualified installer to ensure that the installation conforms to governing local and/or national codes and ordinances

### 2.2 INSTALLATION SAFETY RULES

Your unit is built to provide many years of safe and dependable service, provided it is properly installed and maintained. However, abuse and/or improper use can shorten the life of the unit and create hazards for you, the owner.

#### 2.2.1 Detector

1. The U.S. Consumer Product Safety Commission recommends that users of oil-burning appliances install carbon monoxide detectors. There can be various sources of carbon monoxide in a building or dwelling. The sources could be gas-fired clothes dryers, gas cooking stoves, water heaters, furnaces, gas-fired fireplaces, wood fireplaces, and

several other items. Carbon monoxide can cause serious bodily injury and/or death. Therefore, to help alert people to potentially dangerous carbon monoxide levels, you should have carbon monoxide detectors listed by a nationally recognised agency (ex. Underwriters Laboratories or International Approval Services) installed and maintained in the building or dwelling.

2. There can be numerous sources of fire or smoke in a building or dwelling. Fire or smoke can cause serious bodily injury, death, and/or property damage. Therefore, in order to alert people to potentially dangerous fire or smoke, you should have fire and smoke detectors listed by Underwriters Laboratories installed and maintained in the building or dwelling.

**Note:** The manufacturer of your furnace does not test any detectors and makes no representations regarding any brand or type of detector.

### CAUTION

Ensure that the area around the combustion air intake is free of snow, ice and debris.

### CAUTION

An air pressure switch **MUST** be used when the furnace is side-wall vented.

### CAUTION

Do not use any commercially available soot remover. This furnace has a ceramic fibre type of combustion chamber which does not require cleaning when servicing. Use extreme caution if for any reason you have to work in the area of the combustion chamber.

## 2.2.2 Freezing temperatures and your building

### WARNING

**FREEZING TEMPERATURE WARNING** Turn off water supply. If your heater remains shut off during cold weather, the water pipes could freeze and burst, resulting in serious water damage.

Your unit is equipped with safety devices that may keep it from operating if sensors detect abnormal conditions such as exhaust flues obstructed by snow, ice or debris.

If the structure is unattended during cold weather you should take the following precautions:

1. Turn off main water supply into the structure and drain the water lines if possible. Open faucets in appropriate areas;
2. Have someone check the structure frequently during cold weather to make sure it is warm enough to prevent pipes from freezing. Contact a qualified service agency, if required.

## 2.3 POSITIONING THE FURNACE

### 2.3.1 Location

The unit must be installed in a location where the ambient and return air temperatures are over 15°C (60°F).

### CAUTION

Carefully check your furnace upon delivery for any evidence of damage that may have occurred during shipping and handling. Any claims for damages or lost parts must be made with the transport company.

### CAUTION

This furnace is not watertight and is not designed for outdoor installation. This furnace shall be installed in such a manner as to protect the electrical components from water. Outdoor installation will lead to hazardous electrical conditions and to premature furnace failure.

Position the furnace as closely as possible to the chimney or vent terminal, providing ample clearance to permit easy accessibility for cleaning the inside of the furnace, the removal of filters, blower, motors, controls and flue connections.

However, do not install furnace directly on carpet or other combustible material which can trap air under the furnace floor.

The furnace must be installed level for safe and quiet operation.

**The required minimum clearances for this furnace are specified in Table 1.**

### CAUTION


Do **NOT** operate furnace in a corrosive atmosphere containing chlorine, fluorine or any other damaging chemicals.

**Table 1 – Minimum Clearance**

	RHB/RLB-105/140	RHB/RLB-105/140
	To combustible construction	Service
Top of plenum to ceiling	1"	
Above warm air duct within 6' of furnace	1"	
Front of furnace	18"	18"
Flue pipe or barometric d.c. to any surface	9"	18"
Rear of furnace	0"	
Side of furnace	0"	
Warm air plenum to wall	1"	
Combustible floor	0"	

**Flooring**

RHB & RLB furnaces are approved for installation on combustible flooring, but must never be installed on carpeting.

 **WARNING**

**Do not install furnace on carpeting even if foundation is used. Fire can result, causing severe personal injury, death or substantial property damage.**

**Foundation**

Provide a solid brick or minimum 2 inch thick concrete foundation pad if any of the following is true:

- The floor can become flooded.
- The furnace mounting area is not level.


**Residential garage installations**

Take the following special precautions when installing the furnace in a residential garage. If the furnace is located in a residential garage:


- Mount the furnace a minimum of 18 inches above the floor of the garage.
- Locate or protect the furnace so a moving vehicle cannot damage it.

**2.4 VENTING**

**2.4.1 General venting requirements**

 **WARNING**

**Failure to follow all instructions can result in flue gas spillage and carbon monoxide emissions, causing severe personal injury or death.**

 **DANGER**

**Inspect existing chimney before installing furnace. Clean chimney thoroughly. Replace or repair chimney if visual inspection indicates chimney may be unsuitable for use. Insufficient draft can cause flue gas leakage and carbon monoxide emissions. Failure to clean or replace perforated pipe or tile lining and/or patch mortar and joints can cause severe personal injury or death.**

- RHB & RLB furnaces are designed to operate with an over-fire draft of 0.01" to -0.02" w.c. Proper draft for these oil furnaces may be achieved using either a conventional chimney (natural draft) or a power vent (sidewall) system that has been properly designed for use with oil-fired equipment. Power vent manufacturer's instructions must be followed.
- Use vent material approved by local codes for oil-fired burners. In their absence, refer to:

NFPA 31, Installation of Oil-Burning Equipment.

NFPA-211, Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances.

In Canada, refer to CSA B139, Installation Code for Oil-Burning Equipment.

NFPA-211 requires chimney to be lined before being connected to furnace.

- To prevent downdrafts, extend chimney at least 3 feet above highest point where it passes through roof and 2 feet higher than any portion of building within 10 feet. Increase chimney cross-sectional area and height at least 4% per 1,000 feet above sea level.
- Provide a chimney no smaller than that listed in Table 2.


**Table 2 – Minimum Chimney and Vent Size**

Furnace model number	Minimum vent diameter	Minimum Chimney Size		Minimum chimney height
		Rectangular	Round	
RHB/RLB-105	6"	6" X 6"	6"	15'
RHB/RLB-140	7"	6" X 6"	6"	15'

**NOTE**

Oversized chimneys, outside masonry chimneys and/or derated inputs can result in condensation in chimney. Relining an outside masonry chimney may be needed to avoid condensation, downdrafts and damage to masonry surfaces.

**2.4.2 Vent dampers**


WARNING

**Do not install a thermal-type vent damper on this furnace. Failure to comply could result in severe personal injury, death or substantial property damage.**


**NOTICE** If a vent damper is required, use only a motorized one, installed and wired in the furnace according to the vent damper manufacturer’s instructions.

**2.4.3 Barometric draft control**

Install a barometric control in the vent, as per the manufacturer’s instructions, when excess draft needs to be relieved or to comply with applicable codes and regulations. Use draft gauge to adjust proper opening.

1. Install a barometric draft control in the vent pipe at least one foot from the furnace vent connection, preferably in the highest part of the vent pipe before the vent enters the chimney. If headroom does not provide enough clearance to locate the control at least one foot from the vent connection, install an elbow at the furnace and mount the control in an horizontal pipe at least one foot from the elbow. Install an elbow after the control to turn vertically.
2. To operate correctly, the barometric draft control must be located in the same room as the furnace.
3. Ensure that the barometric draft control is accessible. Adjust the damper to obtain the correct overfire draft, as described in this manual and the burner manual.

**2.5 AIR FOR COMBUSTION**


WARNING

**POISONOUS CARBON MONOXIDE GAS HAZARD. Comply with NFPA or CSA standards for the installation of Oil Burning Equipment and applicable provisions of local building codes to provide combustion and ventilation air. Failure to provide adequate combustion and ventilation air can result in death or personal injury.**

**2.5.1 General**

Oil furnaces must have an adequate supply of combustion air. It is common practice to assume that older homes have sufficient infiltration to accommodate the combustion air requirements for the furnace. However, home improvements such as new windows, doors, and weather stripping have drastically reduced the volume of air infiltration into the home.

Home air exhausters are common. Bathroom and kitchen fans, power vented clothes dryers and water heaters all tend to create a negative pressure in the home. Should this occur the chimney becomes less and less effective and can easily downdraft.

Heat Recovery Ventilation Systems (HRVS) are gaining in popularity. HRVS are not designed to supply combustion air. If not properly balanced, a serious negative pressure condition could develop in the dwelling.

For buildings with tight construction, provide openings directly to outside or to a ventilated crawl space or attic. Size the openings to the same specifications as for the furnace location per the following paragraphs. Follow state, provincial or local codes when sizing adequate combustion and ventilation air openings. In absence of codes, use the following guidelines when furnace is in a confined room (defined by NFPA 31 as less than 7200 cubic feet per 1 GPH input of all appliances in area. A room 8 ft. high x 30.0 ft. x 30.0 ft. is 7200 cu. ft.).

**Provide two permanent openings**

**Opening locations**

One within 12 inches of ceiling, one within 12 inches of floor. Minimum height or width dimension of each rectangular opening should be at least 3 inches.

**When inside air is used**

Each opening must freely connect with areas having adequate infiltration from outside. Each opening should be at least 140 sq. in. per 1 GPH input (1 sq. in. per 1000 BTU input) of all fuel-burning appliances plus requirements for any equipment that can pull air from room (including clothes dryer and fireplace).

**When outside air is used**

Connect each opening directly, by way of ducts to the outdoors, or to crawl or attic space that freely connects with outdoors. Size per below:

- Through outside wall or vertical ducts – at least 35 sq. in. per 1 GPH input (1 sq. in. per 4000 BTU input) of all fuel burning appliances plus requirements for any equipment that can pull air from room (including clothes dryer and fireplace).

- Through horizontal ducts – at least 70 sq. in. per 1 GPH furnace input (1 sq. in. per 2000 BTU input) of all fuel-burning appliances plus requirements for any equipment that can pull air from room (including clothes dryer and fireplace).

- Where ducts are used, they should have the same cross-sectional area as free area of openings to which they connect. Compensate for louver, grille or screen blockage when calculating free air openings. Refer to the manufacturers' instructions for details. If unknown, use:

- a. Wood louvers, which provide 20-25% free air.
- b. Metal louvers or grilles, which provide 60-75% free air.

Lock louvers in open position or interlock with equipment to prove open before furnace operation.

### Basement installations

When the furnace is located in an unconfined space, such as an unpartitioned basement, adequate air should normally be available without additional openings. An unconfined space is defined as one having no less than 50 cubic feet room volume per 1,000 BTU/h input of all appliances in the space.

If the house is of tight construction, provide air openings to the basement directly from outside or from a ventilated attic. Size the openings as described above under "When outside air is used".

### Closet installations – special NOTICE

#### Openings in closet doors

Provide TWO openings – one within 6 inches of top of closet door, the other within 6 inches of the bottom of closet door. Refer to the nameplate for openings dimensions.



### WARNING

**Advise homeowner that the openings to the closet must never be obstructed or blocked in any way. Failure to provide adequate air for combustion and ventilation could result in severe personal injury, death or substantial property damage.**

### 2.5.2 Contaminated Combustion Air

Installations in certain areas or types of structures will increase the exposure to chemicals or halogens which

may harm the furnace. These instances will require that only outside air be used for combustion. The following areas or types of structures may contain or be exposed to certain substances, potentially requiring outside air for combustion:

- a. Commercial buildings;
- b. Buildings with indoor pools;
- c. Furnaces installed near chemical storage areas.

Exposure to the following substances:

- a. Permanent wave chemicals for hair;
- b. Chlorinated waxes and cleaners;
- c. Chlorine based swimming pool chemicals;
- d. Water softening chemicals;
- e. De-icing salts or chemicals;
- f. Carbon tetrachloride;
- g. Halogen type refrigerants;
- h. Cleaning solvent (such as perchloroethylene);
- i. Printing inks, paint removers, varnishes, etc. ;
- j. Hydrochloric acid;
- k. Solvent based glue;
- l. Antistatic fabric softeners for clothes dryers;
- m. Acid based masonry cleaning materials.

## 2.6 OIL TANK AND LINES

Check your local codes for the installation of the tank and accessories.

Prior to each heating season, have the entire oil distribution system checked for leaks.

A manual shut-off valve and an oil filter shall be installed in sequence from tank to burner. Be sure that the oil line is clean before connecting to the burner. The oil line should be protected to eliminate any possible damage. Installations having the fuel oil tank below burner level must employ a two pipe fuel supply system with an appropriate fuel pump; for more than a 2.4 m (8') rise use a 2-stage pump; for more than 4.9 m (16') rise an auxiliary pump.

Follow the pump instructions to determine the size of tubing you need in relation of the lift, or the horizontal distance.

## 2.7 BURNER INSTALLATION

### 2.7.1 Mounting the burner

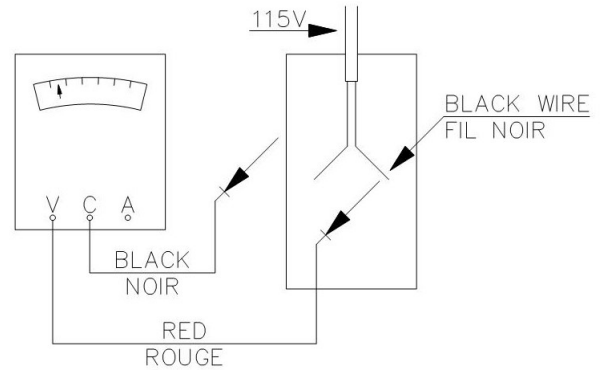
The burner mounting plate on the furnace has a 4-bolt configuration.

1. Check the insertion depth of the burner tube. Refer to the Technical Specifications, tables 4 and 5.



2. Position the mounting gasket between the mounting flange and the appliance burner mounting plate;
3. Line up the holes in the mounting flange with the studs on the mounting plate;
4. Securely bolt the burner in place with supply nuts.

**Figure 1 – Voltmeter Wiring**



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## 2.7.2 After the burner is mounted

1. Remove drawer assembly or air tube combination;
2. Install nozzle (see specifications);
3. Confirm electrode settings;
4. Make the electrical connections;
5. Complete oil line connections.

### CAUTION

Do not turn on the burner until you have checked the following:

## 2.7.3 Checking the polarity

The oil burner used on the furnace has a solid state control system which is sensitive to the proper connection of the hot and neutral power lines. The controls will be damaged if the two lines are reversed.

1. Set your voltmeter to line voltage;
2. Place one prong on your grounded electric entry box and one prong on the black wire;
3. Read the voltage;
4. If the voltage is zero, check the white wire. If line voltage shows, reverse the 115-volt leads entering the furnace junction box (see figure 1);
5. If you do not have a voltmeter, use a pilot light.

## 2.7.4 Checking the nozzle

The burner is equipped with the appropriate nozzle. However, if another size nozzle or replacement nozzle is required, use the manufacturer's nozzle data concerning spray angle, type as shown in Tables 4 and 5.

Always select nozzle sizes by working back from the actual desired flow rate at operating pressure, and not by the nozzle marking.

## 2.7.5 Checking air and turbulator settings

Before starting the burner for the first time, adjust the air and turbulator settings to those listed in Tables 4 and 5. Once the burner becomes operational, final adjustments will be necessary.

## 2.7.6 Checking the fuel supply system

**NOTE:** Use No.1 or No. 2 Heating Oil (ASTM D396) or in Canada, use No.1 or No.2 Furnace Oil.

Before starting the burner be sure the fuel tank is filled with clean oil.

### ! WARNING

**FIRE AND EXPLOSION HAZARD. Use only approved heating type oil in this furnace. DO NOT USE waste oil, used motor oil, gasoline or kerosene. Use of these will result in death, personal injury and/or property damage.**

**NOTE:** You may notice a slight odour the first time your furnace is operated. This will soon disappear. It is only the oil used on certain parts during manufacturing.

**IMPORTANT:** When using nozzle sizes of less than .75 USGPH, the Installation Code for oil burning equipment requires the installation of a 10 (or less) micron filter in the fuel oil line. It is required that this practice be followed in order for the lifetime heat exchanger warranty to be kept intact.

## 2.7.7 Blocked vent shut-off (BVSO) for Chimney venting

### **WARNING**

**It is imperative that this device be installed by a qualified agency.**

This device is designed to detect the insufficient evacuation of combustion gases in the event of a vent blockage. In such a case the thermal switch will shut down the oil burner. The device will then need to be re-armed MANUALLY.

Please refer to the wiring diagrams and the detailed instructions supplied with the BVSO for the installation and wiring procedures. The length of wires supplied with the unit is such that the safety device must be installed between the flue outlet of the appliance and the draft regulator, as indicated in the instructions.

It is also essential that the BVSO be maintained annually. For more details please refer to the instructions supplied with the device itself, as well as Section 4.7 of this Manual.

## 2.8 INSTALL AND WIRE THERMOSTAT

Locate the room thermostat on an interior wall in the natural circulating path of room air. Do not locate thermostat so it is exposed to cold air infiltration, drafts from windows or doors, air currents from supply or return air registers, behind obstructions, on a shelf, in a closet, or in a corner.

Ensure the thermostat won't be exposed to heat from nearby fireplace, radio, television, lamp or rays from the sun. Do not mount thermostat on a wall over a supply or return duct, chimney or vent.

Wire thermostat to furnace and set thermostat anticipator as shown on wiring diagrams, (figures 2 and 3).

## 2.9 INSTALLING ACCESSORIES

### **WARNING**

**ELECTRICAL SHOCK HAZARD. Turn OFF electric power at fuse box or service panel before making any electrical connections and ensure a proper ground connection is made before connecting line voltage. Failure to do so could result in death, bodily injury and/or property damage**

## 2.9.1 Air conditioning

An air conditioning coil may be installed on the supply air side only. Also, notwithstanding the evaporator coil manufacturer's instructions, a minimum of 15 cm (6") clearance must be allowed between the bottom of the coil drain pan and the top of the heat exchanger. Wire the thermostat and condensing unit contactor as indicated in Figure 2.

## 2.9.2 Ductwork and Filter

Design and install the air distribution system to comply with Air Conditioning Contractors of America manuals or other approved methods that conform to local and/or national codes and good trade practices. When furnace supply ducts carry air outside furnace area, seal return air duct to furnace casing and terminate duct outside furnace space. If a separate evaporator and blower unit is used, install appropriate sealing dampers for air flow control. Cold air from the evaporator coil going through the furnace could cause condensation and shorten furnace life.

### **CAUTION**

Dampers (purchased locally) **MUST** be automatic.

### **WARNING**

**POISONOUS CARBON MONOXIDE GAS HAZARD. Do NOT draw return air from inside a closet or utility room. Return air duct MUST be sealed to furnace casing. Failure to properly seal duct can result in death, personal injury and/or property damage**

### **WARNING**

**POISONOUS CARBON MONOXIDE GAS HAZARD. Install evaporator coil on the supply side of the furnace ducting. Evaporator coil installed in return side ducting can cause condensation to form inside heat exchanger resulting in heat exchanger failure. This could result in death, personal injury and/or property damage.**

### **CAUTION**

Return air grilles and warm air registers must not be obstructed.

## 3 OPERATION

### 3.1 SEQUENCE OF OPERATION

1. On the AFG burner, the T-T terminals have to be jumped on the primary control of the burner;
2. Normally open contact (W-R) closes when thermostat calls for heat;
3. Burner motor starts. The burner motor fan pre-purges the combustion chamber and vent for 10 to 15 seconds, establishing the combustion air pattern. After the pre-purge period, the solenoid valve opens, allowing oil to flow through nozzle. At the same time, the burner motor ignition coil produces a spark;
4. Spark ignites oil droplets;
5. Cad cell senses flame and burner continues to fire. Ignition transformer ceases sparking (Riello R40-F);
6. After Fan-Limit Control heats up to the factory set point, the circulating air blower starts;
7. The circulating air blower and burner motor remain on until the thermostat is satisfied;
8. Thermostat is satisfied;
9. Relay contacts open, solenoid valve closes, burner fan motor shuts down and the ignition transformer ceases sparking;

### 3.2 CHECKS AND ADJUSTMENTS

#### 3.2.1 General

During initial start-up and subsequent yearly maintenance calls, the furnace must be thoroughly tested. Open the oil bleed port screw and start the burner. Allow the oil to drain into a container for at least 10 seconds. The oil should flow absolutely free of white streaks or air bubbles to indicate that no air is being drawn into the suction side of the oil piping and pump. Then slowly close and tighten the bleed screw. Fire the burner. Adjust the oil pressure as indicated in Tables 4 and 5.

**IMPORTANT:** The burner must be put in operation for at least 10 minutes before any test readings are taken. For new installations, set up the burner to the settings in Tables 4 and 5 before firing. These are rough adjustments but they will ensure that the burner will start and run smoke-free in advance of the final adjustments to be made.

#### 3.2.2 Restart after burner failure

1. Set thermostat lower than the room temperature;

2. Press the reset button on the burner primary control (relay);
3. Set thermostat higher than the room temperature;
4. If the burner motor does not start or ignition fails, turn off the disconnect switch and CALL A QUALIFIED SERVICE TECHNICIAN

#### CAUTION

Do not attempt to start the burner when excess oil has accumulated, when the furnace is full of vapour, or when the combustion chamber is very hot. Always keep the supply valve closed if the burner is shut down for an extended period of time.

#### 3.2.3 Combustion chamber curing

Some moisture and binders remain in the ceramic combustion chambers after fabrication. It is important to clear the chamber of this residue before testing. If you smoke test before curing, the instrument may become damaged. To cure the chamber, run the unit for 3 consecutive cycles, with 3 minutes of elapsed time in between each cycle. The burner must operate for about 3 minutes per cycle. The exhaust will have a pungent odour and produce a white cloud of steam.

#### 3.2.4 Smoke/CO2 Test

1. On chimney installations, pierce a test hole in the smoke pipe 18" above the furnace breach. On side-wall vented installations, remove the threaded cap from the extended test pipe that is welded into the 4-bolt breach plate. Insert the smoke test instrument probe into the open hole;
2. From a cold start, let the unit operate during 5 to 10 minutes;
3. Set the burner air setting until just a trace of smoke results (#1 on the Bacharach scale);
4. Take a CO2 sample at the same test location where the #1 smoke reading was taken and make note of it. Example: 13.8% of CO2 or 2.5% of O2;
5. Adjust the burner air setting to obtain a CO2 reading 1.5% lower (or a O2 reading 2.0% higher) than the reading associated with the #1 smoke. Example: 12.3% of CO2 or 4.5% of O2;
6. This method of adjusting the burner will result in clean combustion and ensure the proper functioning of the system

#### 3.2.5 Perform the supply air temperature rise test

1. Operate the burner for at least 10 minutes;
2. Measure the temperature of the air in the return air plenum;

3. Measure the temperature of the air in the largest trunk coming off the supply air plenum, just outside the range of radiant heat coming off the heat exchanger; 30 cm (12") away from the plenum on the main take-off is usually sufficient;
4. The temperature rise is calculated by subtracting the return air temperature from the supply air temperature;
5. If the temperature rise exceeds the temperature specified in Tables 4 and 5, change to the next higher blower speed tap until the temperature rise falls to this temperature or below. If the excessive temperature rise cannot be reduced by increasing fan speed, investigate for ductwork restriction(s), dirty or improper air filter, overfiring caused by excessive pump pressure, or improper nozzle sizing.

### 3.2.6 Vent temperature test

1. After 5 to 10 minutes of operation, place a thermometer in the test hole located in the breech pipe;
2. The vent temperature should be between 204 and 302°C (400 and 575°F). If not, check for improper air temperature rise, pump pressure, nozzle size, or for a badly sooted heat exchanger

### 3.2.7 Overfire pressure test procedure

The overfire draft that is taken through the observation port, located above the burner, is a measurement necessary to determine if there is a blockage in the heat exchanger or the flue pipe. RHB and RLB furnaces are designed to operate with an overfire draft of -0.01" to -0.02" w.c. A high pressure condition may be caused by excessive combustion air, due to the air band being too wide open, or a lack of flue draft (chimney effect) or some other blockage, such as soot in the secondary section of the heat exchanger or the use of an oversize nozzle input or high pressure pump.

### 3.2.8 Fan Limit adjustment

Modification of the "FAN ON" and "HI" limit settings on the Fan-Limit can cause a malfunctioning of the furnace and result in premature wear of the heat exchanger.

FAN LIMIT should be set according to the following table:

**Table 3 – Fan limit adjust**

	RLB-105R	RLB-105F	RHB-105/140	RLB-140
<b>HI-LIMIT</b>	180°F	200°F	210°F	230°F
<b>ON FAN</b>	110°F	110°F	110°F	110°F
<b>OFF FAN</b>	90°F	90°F	90°F	90°F

If a longer cool down period is desired, lower the OFF setting.

## CAUTION

Modification of the factory set limits will void the warranty

### 3.2.9 Fan-Limit control check

After operating the furnace for at least 15 minutes, restrict the return air supply by blocking the filters or the return air register and allow the furnace to shut off on High Limit. The burner will shut off but the blower will continue to run. Remove the obstruction and the burner should restart after a few minutes.

### 3.2.10 BVSO performance test

The purpose of the following test is to check that the electrical outlet on the furnace, designated to the BVSO, is functional.

1. Start up the burner;
2. Remove the three-pole plug from the BVSO outlet on the furnace;
3. The burner must shut-off immediately, while the blower continues to run to the end of the cool-down cycle.

If the test is not in line with the above, call a QUALIFIED SERVICE TECHNICIAN.

## 4 MAINTENANCE

### 4.1 PREVENTIVE MAINTENANCE

Preventive maintenance is the best way to avoid unnecessary expense and inconvenience. Have your heating system and burner inspected at regular intervals by a qualified service technician.

A complete combustion test must be performed after each annual service inspection of the unit, to maintain optimum performance and reliability.

## CAUTION

Do not tamper with the unit or controls. Call a qualified service technician.

## WARNING

**ELECTRICAL SHOCK HAZARD. Turn off power to furnace before any disassembly or servicing. Failure to do so can result in bodily injury and/or death property damage.**

Before calling for service, check to following.

1. Check oil tank gauge and check if the valve is open;

2. Check fuse or circuit breaker;
3. Check if shut-off switch is "ON";
4. Set thermostat above room temperature;
5. If ignition does not occur, turn off the disconnect switch and call a qualified service technician.

**NOTE:** When ordering replacement parts, specify the complete furnace model and serial number.

## 4.2 HEAT EXCHANGER

The entire heat exchanger should be inspected annually for soot accumulation. If the burner is operating normally there should be very little soot accumulation. If the heat exchanger requires scale removal, use a wire brush first, to loosen the scale and then vacuum the soot and scale that has fallen into the secondary heat exchanger (radiator) section. You will find that a 36" long flexible hose attachment will be helpful to reach into the back of the radiator. A piece of 1/2" flexible gas connector, or a piece of 1/2" liquid-tight vinyl jacket metallic electrical conduit works well as a makeshift device.

### 4.2.1 Cleaning the heat exchanger

Using clean-out port check for soot deposits. If there is very little soot in the radiator section visible from the clean-out port, you will not need to clean it. However, if you notice scaling in the radiator, you should remove it. The wrap-around radiator can now be cleaned entirely from the front inspection port. The furnace also has external clean-out ports so the soot does not fall into the fan compartment during the cleaning operation.

**IMPORTANT:** DO NOT VACUUM THE CERAMIC CHAMBERS—they are easily damaged.

Soot will have collected in the first sections of the heat exchangers only if the burner was started after the combustion chamber was flooded with fuel oil, or if the burner has been operating in a severely contaminated condition.

### 4.2.2 Refractory firepot

Remove the burner and check the firepot.

**IMPORTANT** This furnace has a fibre type refractory combustion chamber. Normal servicing of this unit does not require cleaning of the combustion chamber. If cleaning of the pot should be required, use extreme care. After firing, the pot becomes very fragile. Do not use any commercially available soot removers.

If the pot is damaged, it must be replaced. A damaged pot could lead to premature heat exchanger failure. Cracking of the firepot is normal, however, replace the pot only if the cracks have propagated more than 2/3 the way

through the wall thickness. The average wall thickness of the firepot is 19 mm (3/4").

## **CAUTION**

If you observe the red warning light on the burner, push **ONLY** once to try and restart. If the burner does not start, call a qualified service technician. Do **NOT** press the button again.

### Flooding of the firepot

Flooding can occur when the oil primary control has been reset a number of times in a no-heat situation. Each time oil is fired into the pot and does not ignite, it is absorbed into the pot. Even if the burner is removed and the pot is felt for wetness, it is difficult to assess the degree of oil absorption by the pot.

There is only one way to properly service a flooded firepot, and that is to replace it.

## 4.3 BURNER

### 4.3.1 Drawer assembly

Remove the drawer assembly. Clean all foreign matter from the retention head and electrodes. If a Beckett AFG burner has been installed, the burner will have to be removed to check the retention head

### 4.3.2 Nozzle

Replace the nozzle with the one specified in Tables 4 and 5.

## 4.4 OIL FILTER

### 4.4.1 Tank filter

The tank filter should be replaced as required.

### 4.4.2 Secondary filter

The 10 micron (or less) filter cartridges should be replaced annually.

## 4.5 AIR FILTER

Air filters are the disposable type. They should be replaced at least once a year. Dusty conditions, presence of animal hair etc. may require more frequent filter changes. Dirty filters will impact furnace efficiency and increase oil consumption.

## 4.6 MOTOR LUBRICATION

Do **NOT** lubricate the oil burner motor or the direct drive blower motor as it is permanently lubricated.

## 4.7 BLOCKED VENT SHUT OFF (BVSO) CLEANING

For continued safe operation, the Blocked Vent Shut-Off System (BVSO) needs to be inspected and maintained annually by a qualified service technician.

### WARNING

**ELECTRICAL SHOCK HAZARD. Failure to follow this warning could result in personal injury or death. Disconnect electrical power supply to the furnace before servicing the blocked vent shut-off.**

1. Remove the two screws holding down the BVSO assembly cover;
2. Remove the cover;
3. Remove the two screws holding the control box to

the heat transfer tube assembly. Sliding the control box in the appropriate direction will unlock it from the heat transfer tube assembly;

4. Carefully remove any build-up from the thermal switch surface;
5. Clear and remove any build-up or obstruction inside the heat transfer tube;
6. Re-mount, lock and fasten the control box with the 2 screws removed in step 3;
7. Re-attach the assembly cover with the screws removed in step 1;
8. Re-establish power to the appliance

### CAUTION

Do not dent or scratch the surface of the thermal switch. If the thermal switch is damaged, it must be replaced.

# 5 FURNACE INFORMATION

Model: ..... Serial number: .....

Furnace installation date: .....

Service telephone # - Day: ..... Night: .....

Dealer name and address: .....

.....

.....

## START-UP RESULTS

Nozzle: ..... Pressure: ..... lb/po2

Burner adjustments: Primary air .....

Fine air .....

Drawer Assembly .....

% CO2: ..... Smoke scale: ..... (Bacharach)

Gross stack temperature: ..... °F

Ambient temperature: ..... °F

Chimney draft: ..... " W.C.

Overfire draft: ..... " W.C.

Test performed by: .....

## 6 DIMENSIONS AND RATINGS

Table 4 – Technical Specifications RHB

Rating and performance	RHB-105		RHB-140
Firing rate (USGPH)	0.65	0.75	1.00
Input (BTU/h)	91 000	105 000	140 000
Minimum - maximum temperature rise	65-80°F (36-44.5°C)		65-80°F (36-44.5°C)
<b>BECKETT BURNER, AFG (3450 RPM) / insertion</b>	5 1/2"		8 1/4"
<b>AHRI model#</b>	RHB-105-SD-80-BF	RHB-105-SD-90-BF	RHB-140-SD-120-BF
Heating capacity (BTU/h)	79 000	90 000	119 000
Low firing rate baffle	Yes	Yes	No
Static disc, model	3 3/8 U	3 3/8 U	2 3/4 U
Nozzle (Delavan)	0.65-80B	0.75-80B	1.00 - 70A
Pump pressure (PSIG)	100	100	100
Combustion air adjustment (band/shutter)	0/6	0/7	0 / 6
Head	F3	F4	F3
AFUE%	86.0%	85.0%	85.0%
<b>BECKETT BURNER, NX / insertion</b>	5 1/4"		7 7/8"
<b>AHRI model#</b>	RHB-105-SD-80-BNX	RHB-105-SD-90-BNX	RHB-140-SD-120-BNX
Heating capacity (BTU/h)	79 000	90 000	119 000
Low firing rate baffle	No	No	No
ATC	NX70LBHS	NX70LBHS	NX90LBHS
Nozzle (Delavan)	0.55x60W	0.65x60W	0.85 x 60W
Pump pressure (PSIG)	140	140	140
Combustion air adjustment	1.75	2.50	3.5
Head	9 slot	9 slot	9 slot
AFUE%	86.0%	86.0%	86.0%
<b>RIELLO BURNER, insertion</b>	40-F3, 5 1/2"		40-F5, 8"
<b>AHRI model#</b>	RHB-105-SD-80-RF	RHB-105-SD-90-RF	RHB-140-SD-120-RF
Heating capacity (BTU/h)	79 000	90 000	119 000
Nozzle (Delavan)	0.55-60B	0.60-60B	0.85 - 60B
Pump pressure (PSIG)	140	155	140
Combustion air adjustment (band/shutter)	1 / 1.75	2 / 2.75	1 / 2.5
AFUE%	86.0%	85.5%	85.2%
<b>ELECTRICAL SYSTEM</b>			
Volts - Hertz - Phase	115 - 60 - 1		115 - 60 - 1
Electrical load (Amps)	15.4		16.9
Minimum ampacity for wiring size	17.7		19.5
Max. fuse size (Amps)	20		20
<b>BLOWER DATA</b>			
Blower speed at 0.50"w.c.	MED-LOW	MED-HIGH	MED-HIGH
Blower speed at 0.25"w.c.	MED-LOW	MED-HIGH	MED-HIGH
Maximum cooling, tons @ 0.50"w.c.	3.5	3.5	5
Motor Hp	1/2	1/2	1
Blower size	100-10T		120-10T
Filter quantity and size (in.)	(1) 16 x 24		(1) 20X30

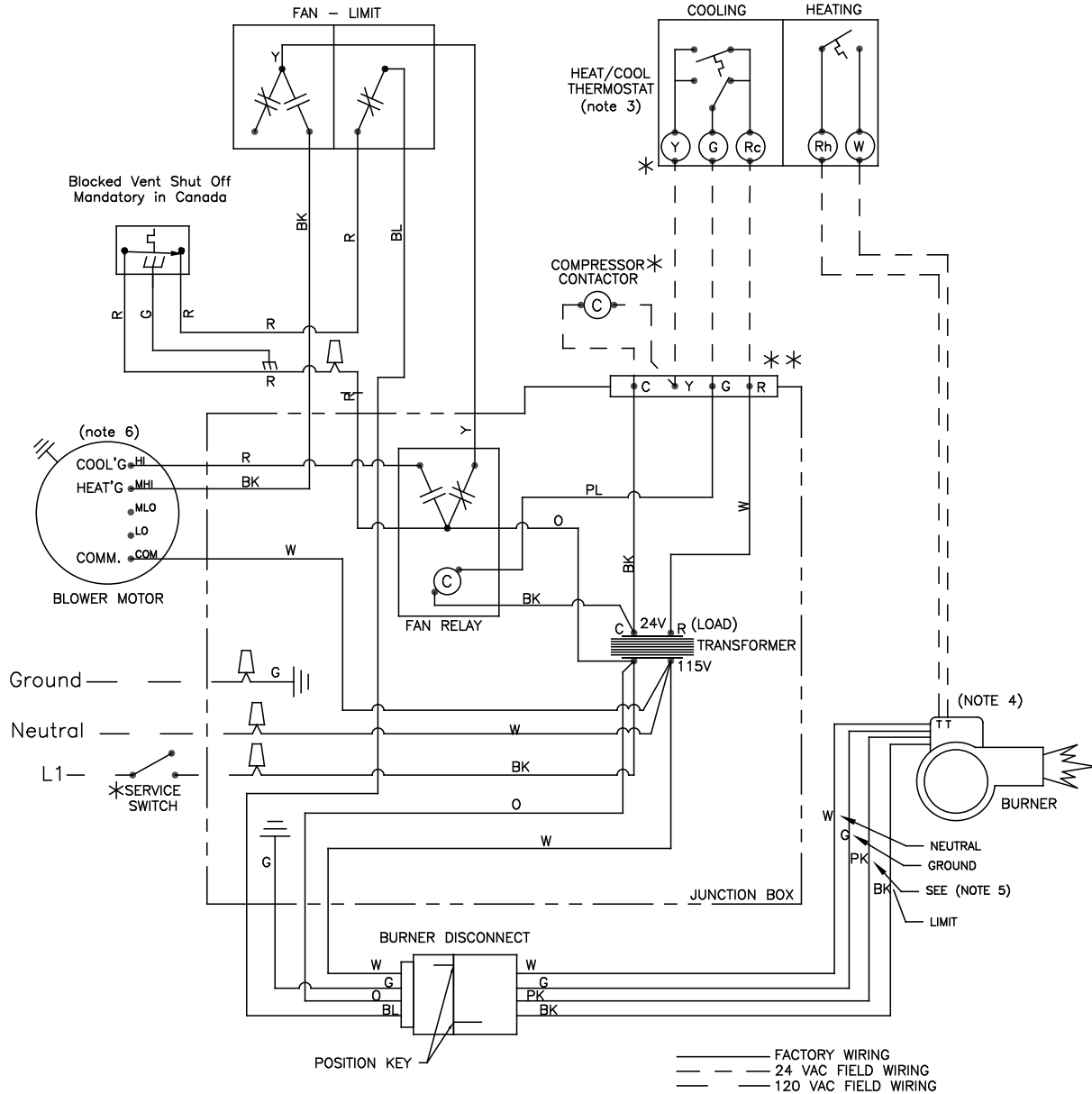


**Table 5 – Technical Specifications RLB**

<b>Rating and performance</b>	<b>RLB-105 F/R</b>			<b>RLB-140 F/R</b>	
Firing rate (USGPH)	0.65	0.75	0.85	1.00	1.20
Input (BTU/h)	91 000	105 000	119 000	140 000	168 000
Minimum - maximum temperature rise	65-80°F (36-44.5°C)			65-80°F (36-44.5°C)	
<b>BECKETT BURNER, AFG (3450 RPM)- Insertion</b>	5 1/2"			8 1/4"	
<b>AHRI model# RLB-</b>	105R-SD-80-BF	105R-SD-90-BF	105R-SD-100-BF	140R-SD-120-BF	140R-SD-140-BF
Heating capacity (BTU/h)	79 000	90 000	101 000	119 000	141 000 / 142 000
Low firing rate baffle	Yes	Yes	Yes	No	No
Static disc, model	3 3/8 U	3 3/8 U	3 3/8 U	2 3/4 U	2 3/4 U
Nozzle (Delavan)	0.65 - 80B	0.75 - 80B	0.85 - 80B	1.00 - 70A	1.25 - 70A
Pump pressure (PSIG)	100	100	100	100	100
Combustion air adjustment (band/shutter)	0 / 6	0 / 7	0 / 9	0 / 6	2 / 4
Head	F3	F4	F4	F3	F3
AFUE% (FRONT FLUE / REAR FLUE)	86.0% / 86.1%	86.0% / 85.2%	85.3% / 85.2%	85.7% / 85.7%	85.6% / 85.9%
<b>BECKETT BURNER, NX - Insertion</b>	5 1/4"			7 7/8"	
<b>AHRI model# RLB-</b>	105R-SD-80-BNX	105R-SD-90-BNX	105R-SD-100-BNX	140R-SD-120-BNX	140R-SD-140-BNX
Heating capacity (BTU/h)	79 000	90 000	101 000	119 000	141 000 / 142 000
Low firing rate baffle	No	No	No	No	Yes (32229)
ATC	NX70LBHS	NX70LBHS	NX70LBHS	NX90LBHS	NX90LDHS
Nozzle (Delavan)	0.55 - 60W	0.65 - 60W	0.75 - 60W	0.85 X 60W	1.00 X 60W
Pump pressure (PSIG)	140	140	140	140	150
Combustion air adjustment	1.75	2.50	3.00	3.5	2.50
Head	9 slot	9 slot	9 slot	9 slot	9 slot
AFUE% (FRONT FLUE / REAR FLUE)	86.0% / 85.9%	86.0% / 85.4%	85.5% / 85.5%	86.0% / 86.0%	85.4% / 85.6%
<b>RIELLO BURNER, Insertion</b>	40-F3, 5 1/2"			40-F5, 8"	
<b>AHRI model# RLB-</b>	105R-SD-80-RF	105R-SD-90-RF	105R-SD-100-RF	140R-SD-120-RF	140R-SD-140-RF
Heating capacity (BTU/h)	79 000	90 000	101 000	119 000	141 000 / 142 000
Nozzle (Delavan)	0.55 - 60B	0.60 - 60B	0.75 - 60B	0.85 - 60B	1.10 - 60B
Pump pressure (PSIG)	140	155	130	140	120
Combustion air adjustment (band/shutter)	1 / 1.75	2 / 2.75	2 / 3.75	1 / 2.5	2 / 3.25
AFUE% (FRONT FLUE / REAR FLUE)	86.0% / 86.4%	86.0% / 86.2%	85.2% / 85.6%	86.0% / 86.0%	85.1% / 86.1%
<b>ELECTRICAL SYSTEM</b>					
Volts - Hertz - Phase	115 - 60 - 1			115 - 60 - 1	
Electrical load (Amps)	15.4			16.9	
Minimum ampacity for wiring size	17.7			19.5	
Max. fuse size (Amps)	20			20	
<b>BLOWER DATA</b>					
Blower speed at 0.50" w.c.	MED-LOW	MED-HIGH	HIGH	MED-HIGH	HIGH
Blower speed at 0.25" w.c.	MED-LOW	MED-HIGH	HIGH	MED-HIGH	HIGH
Maximum cooling, tons @ 0.50" w.c.	3.5			5	
Motor Hp, number of speeds	1/2			1	
Blower size	100-10T			120-10T	
Filter quantity and size (in.)	(1) 12X20 / (1) 10X20			(1) 16X24 / (1) 12X24	

Figure 2 – Wiring Diagram

SCHEMATIC WIRING DIAGRAM  
DIRECT DRIVE



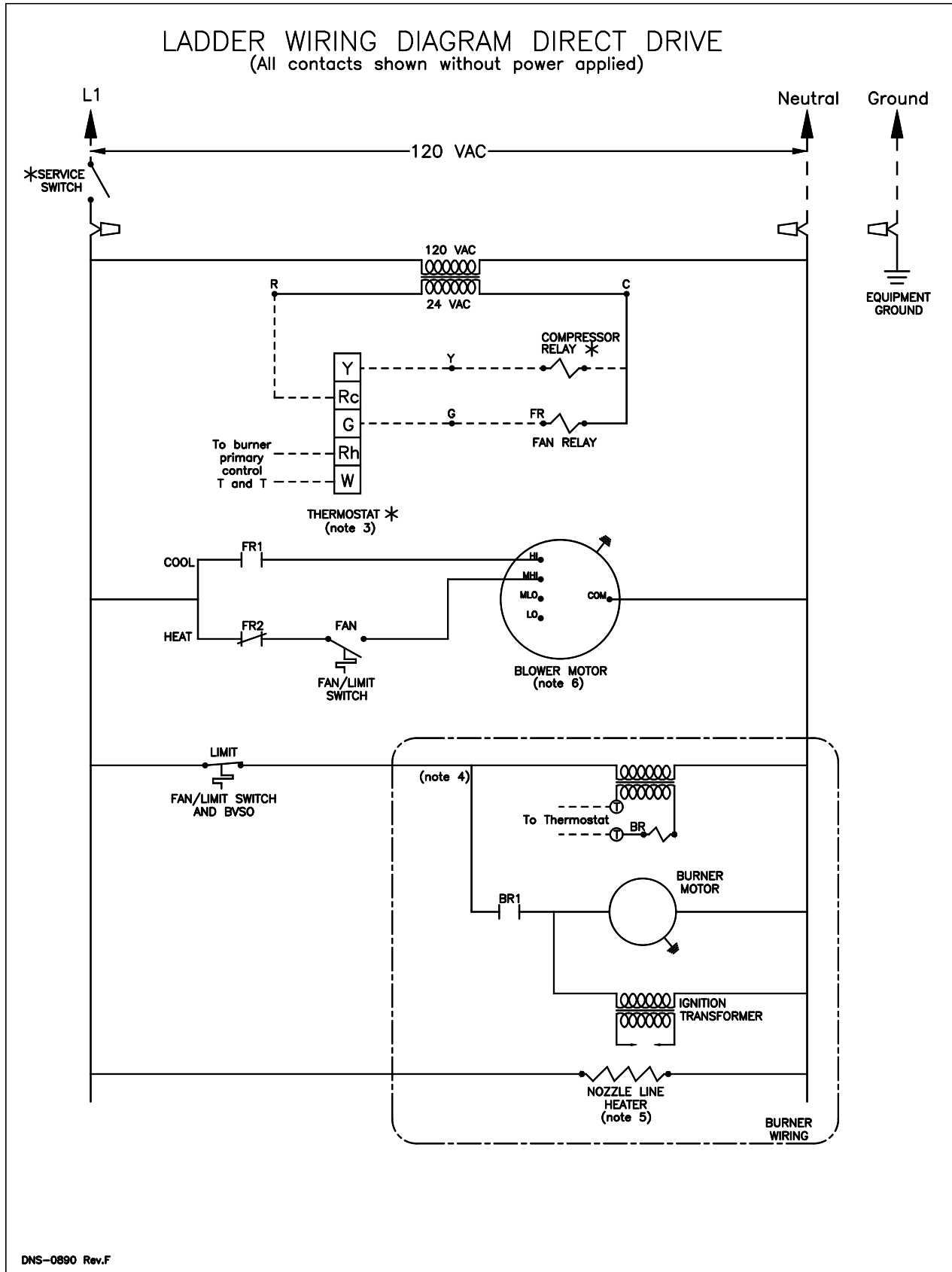
NOTES:

1. All wiring must be installed in accordance with:
  - A) U.S.A. – N.E.C. And any other national, state, or local code requirements.
  - B) Canada – C.S.A. C22.1.C.E.E. Part 1 and any other national, provincial, or local code requirements.
2. If any of the original wire as supplied with the appliance must be replaced, use minimum 105°C wire or equivalent.
3. Thermostat anticipator setting – 0,20 amp.

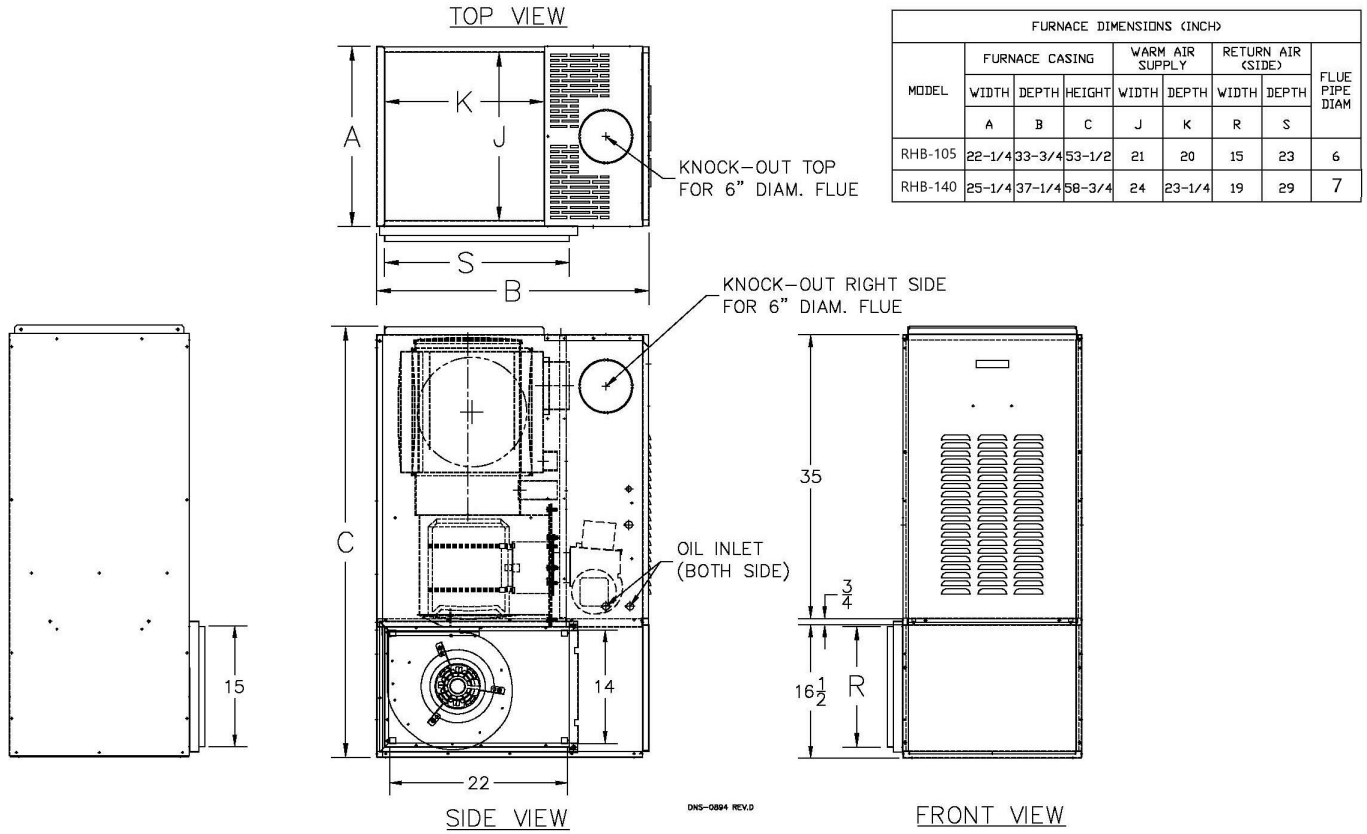
4. Refer to control component instructions packed with the furnace burner for application information.
5. Pink wire is continuous electric power used with nozzle line heater (Carlin EZ), control with post purge option or burner with electric damper if required. Leave wire capped and unattached if not used.
6. Refer to technical specification for blower speed adjustment.
7. Capacitor 7.5 MF. for 105
8. Capacitor 10 MF. for 140

\* Items not provided  
\*\* Low voltage terminal strip

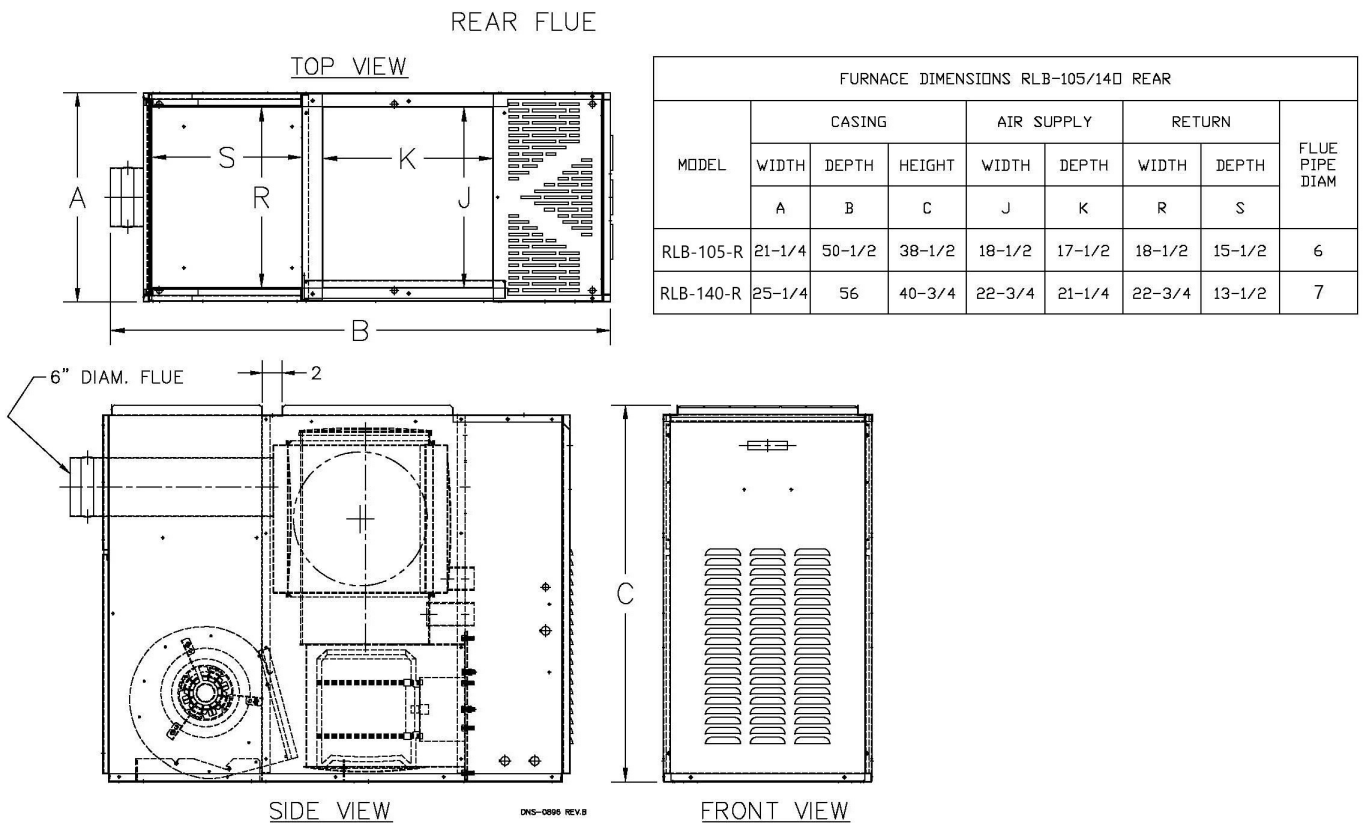
Figure 3 – Ladder wiring diagram



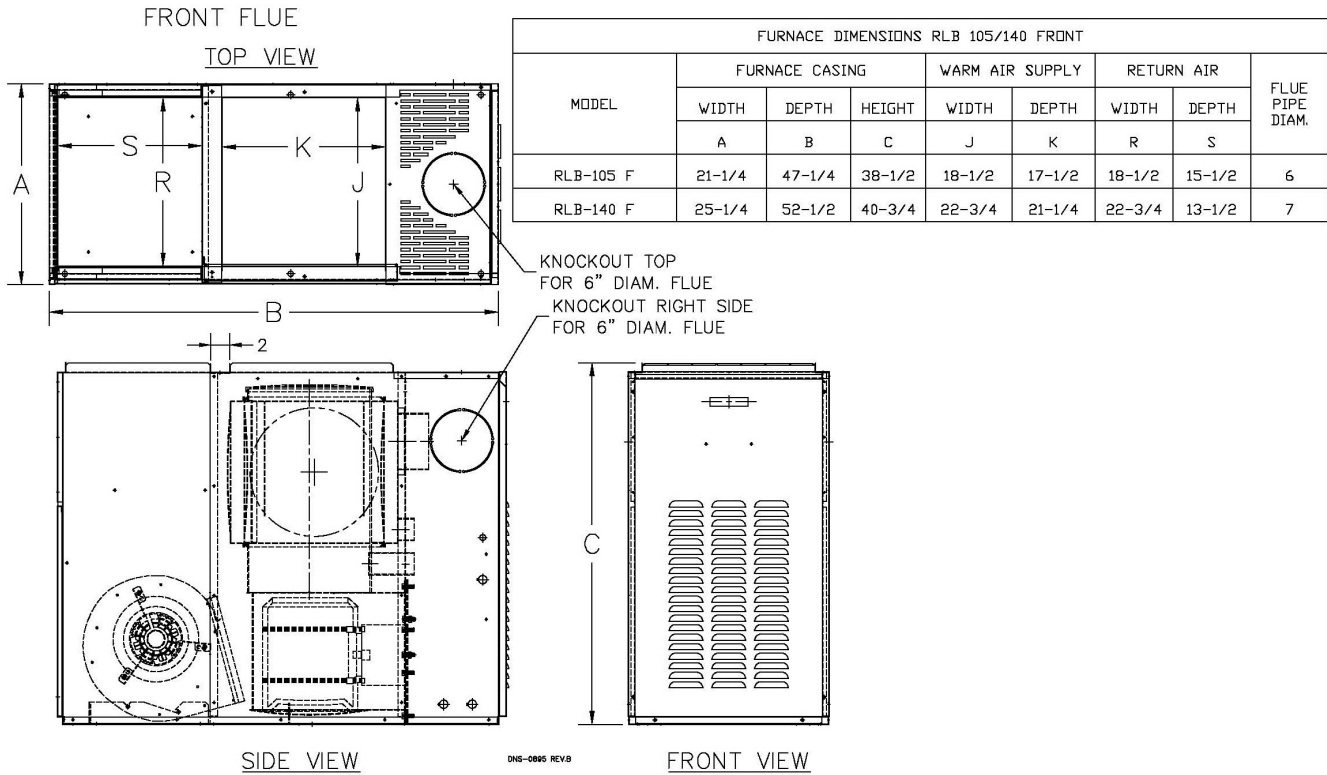
**Figure 4 – Dimensions RHB-105/140**



**Figure 5 – Dimensions RLB-105/140 R**



**Figure 6 – Dimensions RLB-105/140 F**

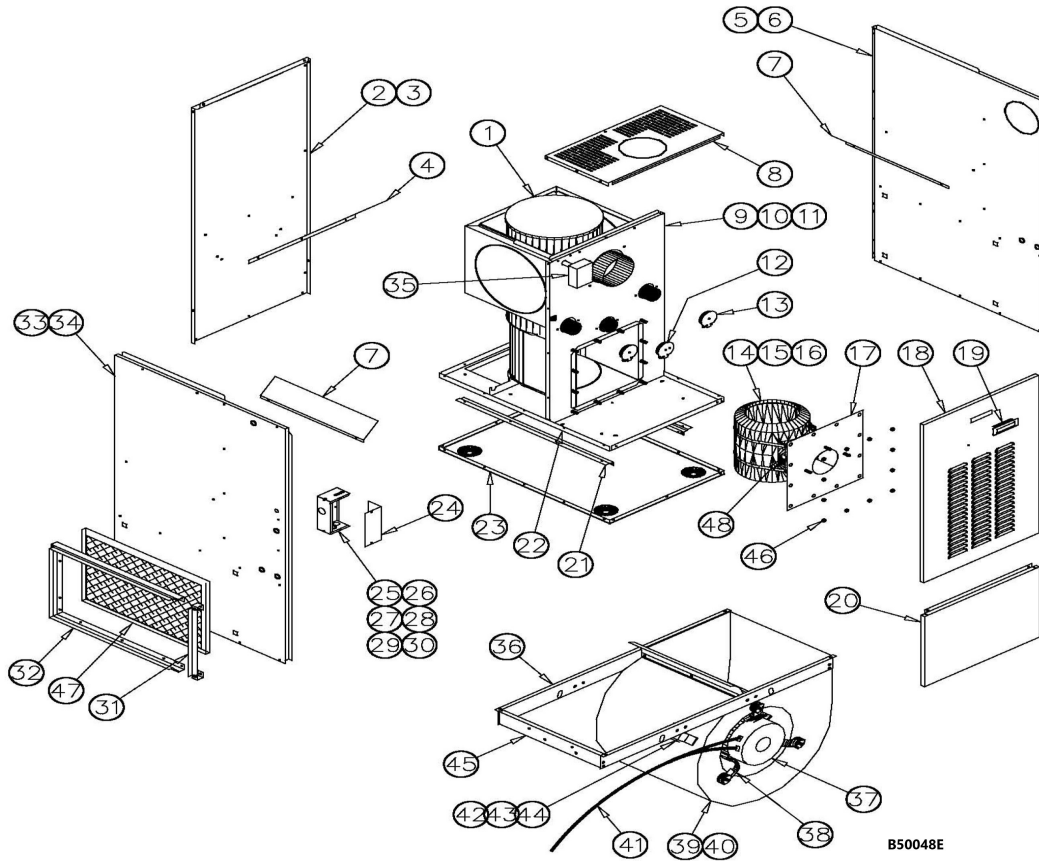


**Table 6 – Airflow**

MODEL	BLOWER SPEED	EXTERNAL STATIC PRESSURE ("W.C.)						
		0.1	0.2	0.3	0.4	0.5	0.6	0.7
RHB-105	MED-LOW	1065	1055	1045	1035	1025	1015	1005
	MED-HIGH	1220	1190	1160	1130	1100	1070	1040
	HIGH	1475	1450	1400	1350	1300	1250	1200
RLB-105F	MED-LOW	1165	1155	1145	1135	1125	1115	1105
	MED-HIGH	1345	1315	1285	1255	1225	1195	1165
	HIGH	1535	1505	1445	1385	1325	1265	1205
RLB-105R	MED-LOW	1165	1155	1145	1135	1125	1115	1105
	MED-HIGH	1345	1315	1285	1255	1225	1195	1165
	HIGH	1535	1505	1445	1385	1325	1265	1205
RHB-140	MED-HIGH	1615	1605	1595	1585	1575	1565	1555
	HIGH	1975	1950	1900	1850	1800	1750	1700
RLB-140F	MED-HIGH	1615	1605	1595	1585	1575	1565	1555
	HIGH	1975	1950	1900	1850	1800	1750	1700
RLB-140R	MED-HIGH	1615	1605	1595	1585	1575	1565	1555
	HIGH	1975	1950	1900	1850	1800	1750	1700

# 7 REPLACEMENT PARTS

Figure 7 – RHB-105

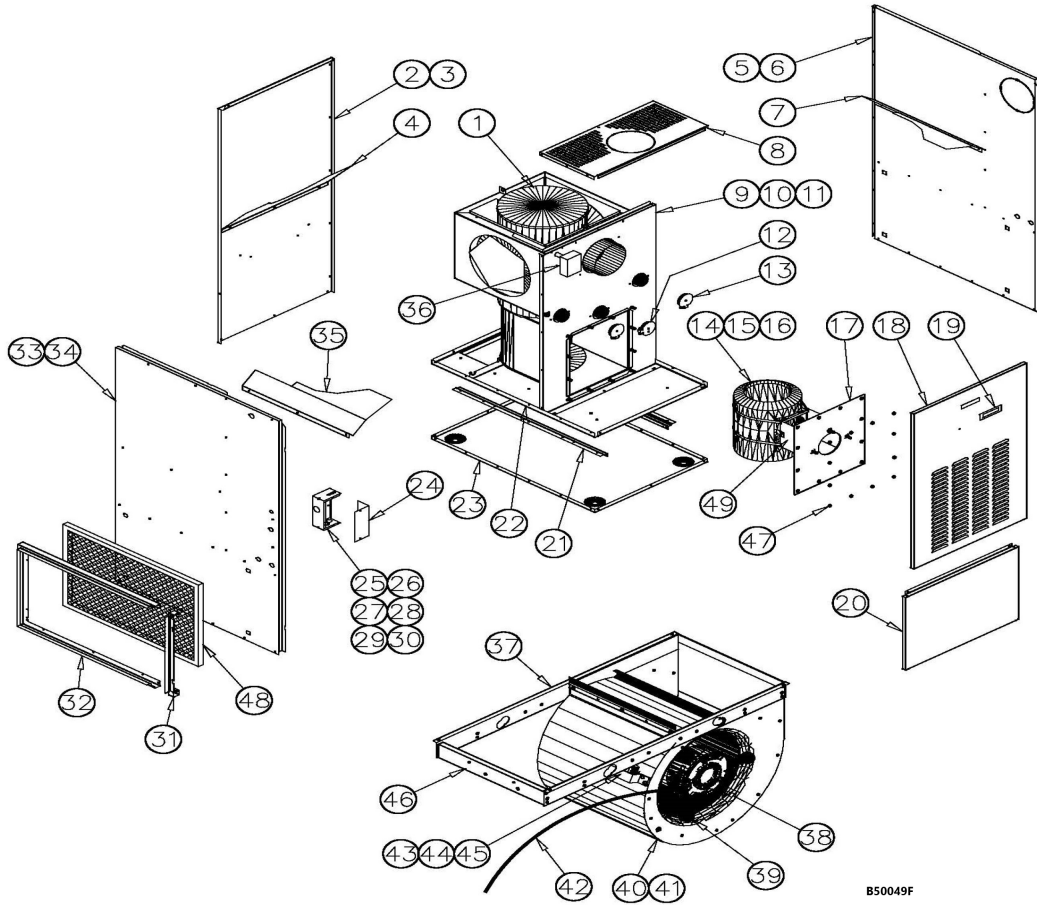


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Table 7 – Replacement part list RHB-105

Item	Description	Part Number	Item	Description	Part Number
1	Heat exchanger	B02935-01	27	Relay SPDT 24 VAC	L01H009
2	Rear panel assembly	B02971-01	28	Terminal 4 buss	L05F009
3	Rear panel insulation	B02969	29	Fan limit wire harness	B02917
4	Rear baffle	B02963	30	Burner wire harness	B02915
5	Right side panel assembly	B02970-06	31	Filter rack access	B01696-01
6	Right side panel insulation	B02968-01	32	Filter rack "U" Frame	B01695-01
7	Baffle	B02964	33	Left side panel assembly	B02970-07
8	Top panel	B02959-01	34	Left side panel insulation	B02968-02
9	Front panel divider assembly	B02972	35	Fan limit	B04272-02
10	Front divider insulation	B02967	36	Blower slides (qty 2)	B01681
11	Observation tube gasket	B01014	37	Motor 1/2 hp	L06H004
12	Observation door	B02111	38	Motor support assembly	B01888
13	Clean out door	B01842	39	Blower assembly	B01979-01
14	Burner plate assembly	B02938	40	Blower 100-10T	B03720-04
15	Combustion chamber	B02898	41	Motor wiring harness	B02916
16	Burner plate	B02952	42	Capacitor holder	B01024
17	Gasket, burner plate	B02907	43	Capacitor 7.5 MF	L01I002
18	Front door (door only)	B02958-01	44	Rubber cap capacitor	L99Z007
19	Handle	Z99F050	45	Electric box support	B01682
20	Blower door	B02979-01	46	Hex nut 3/8-NC brass (qty 12)	F07O001
21	Blower slides (QTY 2)	B01680	47	Paper filter 16" x 24"	obtain locally
22	Blower deck assembly w item 21	B02973	48	Combustion Chamber support	B02953
23	Floor	B02960		Blocked vent Shut-Off BVSO-225-A	Z06G001
24	Electrical Box Cover	B02978-01		Blocked vent Shut-Off BVSO-225-A	Z06G001
25	Electrical box assembly	B02977		Electric kit BVSO ext.	B03118-01
26	Transformer	L01F009		Electric kit BVSO int.	B03331-01

**Figure 8 – RHB-140**



B50049F

**Table 8 – Replacement part list RHB-140**

Item	Description	Part Number	Item	Description	Part Number
1	Heat exchanger	B03115-01	27	Relay SPDT 24 VAC	L01H009
2	Rear panel assembly	B03174-01	28	Terminal 4 buss	L05F009
3	Rear panel insulation	B03182	29	Fan limit wire harness	B02917
4	Rear baffle	B03158	30	Burner wire harness	B02915
5	Right side panel assembly	B03173-06	31	Filter rack access	B01808-01
6	Right side panel insulation	B03181-01	32	Filter rack "U" Frame	B01809-01
7	Baffle, right side	B03157-01	33	Left side panel assembly	B3173-08
8	Top panel	B03135-01	34	Left side panel insulation	B02968-02
9	Front panel divider assembly	B03175	35	Baffle (left side)	B03157-02
10	Front divider insulation	B03180	36	Fan limit	B04272-02
11	Observation tube gasket	B01014	37	Blower slides (qty 2)	B01681
12	Observation door	B02111	38	Motor 1 hp	L06K001
13	Clean out door	B01842	39	Motor support assembly	B01889
14	Burner plate assembly	B03160	40	Blower assembly	B02582-01
15	Combustion chamber	B02899	41	Blower 120-10T	B03720-05
16	Burner plate	B03149	42	Motor wiring harness	B02916
17	Gasket, burner plate	B02905	43	Capacitor holder	B01024
18	Front door (door only)	B03153-01	44	Capacitor 10 MF	L011003
19	Handle	Z99F050	45	Rubber cap capacitor	L99Z007
20	Blower door	B03177-01	46	Electric box support	B01682
21	Blower slides	B01794	47	Hex nut 3/8-NC brass (qty 12)	F07O001
22	Blower deck assembly	B03176	48	Paper filter 20" x 30"	obtain locally
23	Floor	B03156	49	Combustion Chamber support	B03148
24	Electrical Box Cover	B02978		Blocked vent Shut-Off BVSO-225-A	Z06G001
25	Electrical box assembly	B02977		Electric kit BVSO ext.	B03118-01
26	Transformer	L01F009		Electric kit BVSO int.	B03331

Figure 9 – RLB-105 R

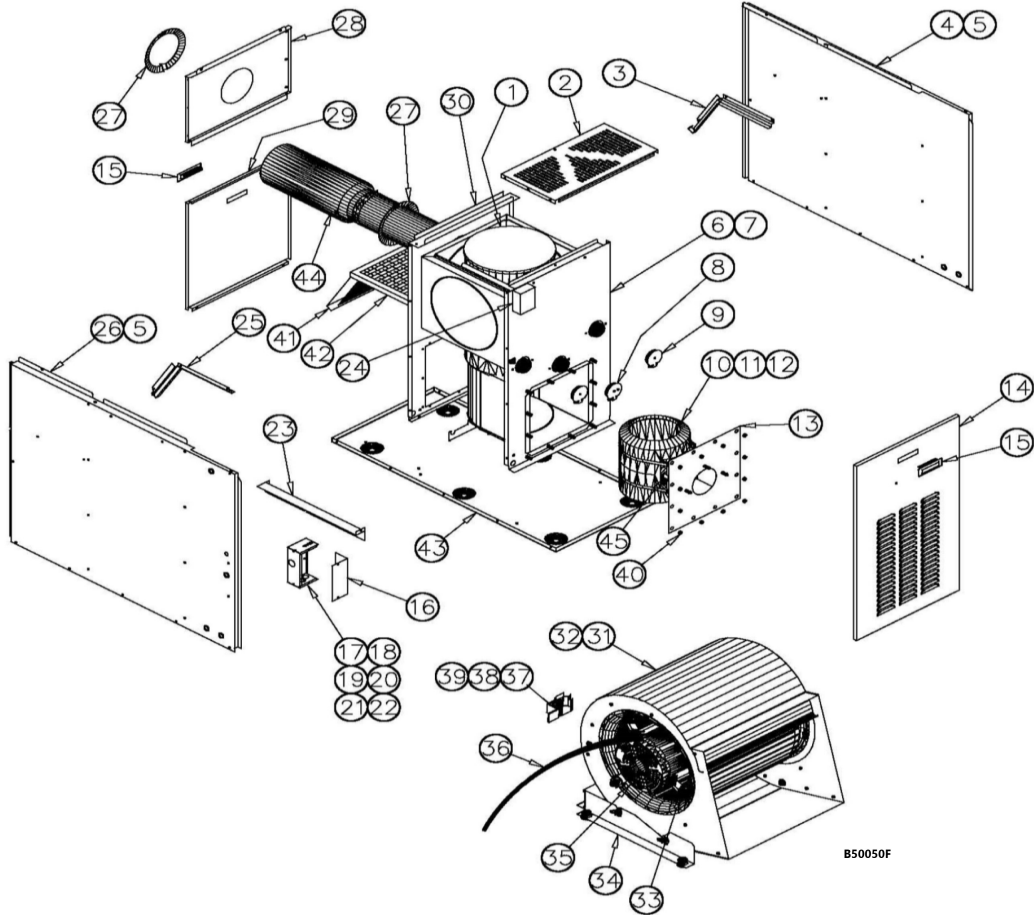
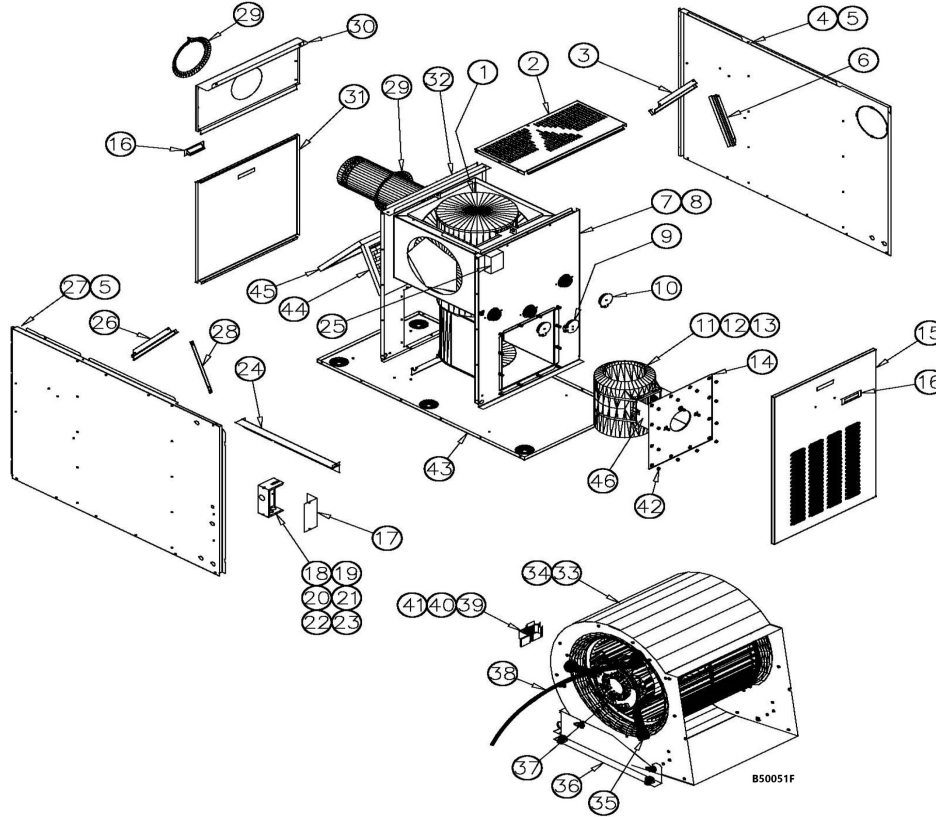


Table 9 – Replacement part list RLB-105 R

Item	Description	Part Number	Item	Description	Part Number
1	Heat exchanger	B2935-02	25	Filter rack left side	B03014-02
2	Front top panel	B03010-01	26	Left side panel assembly	B03017-11
3	Filter rack right side	B03014-01	27	Collar	B10016-03
4	Right side panel assembly	B03017-12	28	Rear top panel	B03008-04
5	Side panel insulation	B03016	29	Blower door	B03012-01
6	Front divider panel assembly	B03022	30	Rear divider panel assembly	B03027-02
7	Front divider panel insulation	B03021	31	Blower assembly	B02584-01
8	Observation door	B02111	32	Blower 100-10T	B03720-04
9	Clean out door	B01842	33	Motor support assembly	B01888
10	Burner plate assembly	B02938	34	Blower support	B03013
11	Combustion Chamber	B02898	35	Motor 1/2 hp	L06H004
12	Burner plate	B02952	36	Blower, wiring harness	B02916
13	Gasket, burner plate	B02907	37	Capacitor holder	B01024
14	Front door (only)	B03011-01	38	Capacitor 7.5 MF	L01I002
15	Handle	Z99F050	39	Rubber cap capacitor	L99Z007
16	Electrical box cover	B02978-01	40	Hex nut 3/8-NC brass	F07O001
17	Electrical box assembly	B02977	41	paper filter 10"x20"	Obtain locally
18	Transformer	L01F009	42	paper filter 12"x20"	Obtain locally
19	Relay SPDT 24VAC	L01H009	43	Floor assembly	B03025
20	Terminal 4 buss	L05F009	44	Outlet protector assembly	B03900
21	Burner wire harness	B02915	45	Combustion chamber support	B02953
22	Fan limit wire harness	B02917		Blocked vent Shut-Off BVSO-225-A	Z06G001
23	Wire Conduit	B03015		Electric kit BVSO ext.	B03118-01
24	Fan Limit	B04272-02		Electric kit BVSO int.	B03335-02



**Figure 10 – RLB-140 R**



**Table 10 – Replacement part list RLB-140 R**

Item	Description	Part Number	Item	Description	Part Number
1	Heat exchanger	B03115-02	26	Filter rack left side	B03146-02
2	Front top panel	B03136-01	27	Left side panel assembly	B03162-13
3	Filter rack right side	B03146-01	28	Filer rack left side	B03147-02
4	Right side panel assembly	B03162-11	29	Ring	B03138-02
5	Side panel insulation	B03169	30	Rear top panel	B03133-03
6	Filter rack right side	B03147-01	31	Blower door	B03134-01
7	Front divider panel assembly	B03166	32	Rear divider panel assembly	B03168-02
8	Front divider panel insulation	B03171	33	Blower assembly	B02583-01
9	Observation door assembly	B02111	34	Blower 120-10T	B03720-05
10	Clean out door assembly	B01842	35	Motor support assembly	B01889
11	Burner plate assembly	B03160	36	Blower support	B03143
12	Combustion chamber	B02899	37	Motor 1 hp	L06K004
13	Burner plate	B03149	38	Blower, wiring harness	B02916
14	Gasket, burner plate	B02905	39	Capacitor holder	B01024
15	Front door (only)	B03137-01	40	Capacitor 10 MF	L01I003
16	Handle	Z99F050	41	rubber cap capacitor	L99Z007
17	Electrical box cover	B02978	42	Hex nut 3/8-NC brass (qty 12)	F07O001
18	Electrical box assembly	B02977	43	Floor assembly	B03167
19	Transformer	L01F009	44	Paper filter 12"x24"	Obtain locally
20	Realy SPDT 24VAC	L01H009	45	Paper filter 16"x24"	Obtain locally
21	Terminal 4 buss	L05F009	46	Combustion chamber support	B03148
22	Burner wire harness	B02915		Blocked vent Shut-Off BVSO-225-A	Z06G001
23	Fan limit wire harness	B02917		Electric kit BVSO ext.	B03118-01
24	Wire conduit	B03144		Electric kit BVSO int.	B03335-03
25	Fan limit	B04272-02			

Figure 11 – RLB-105 F

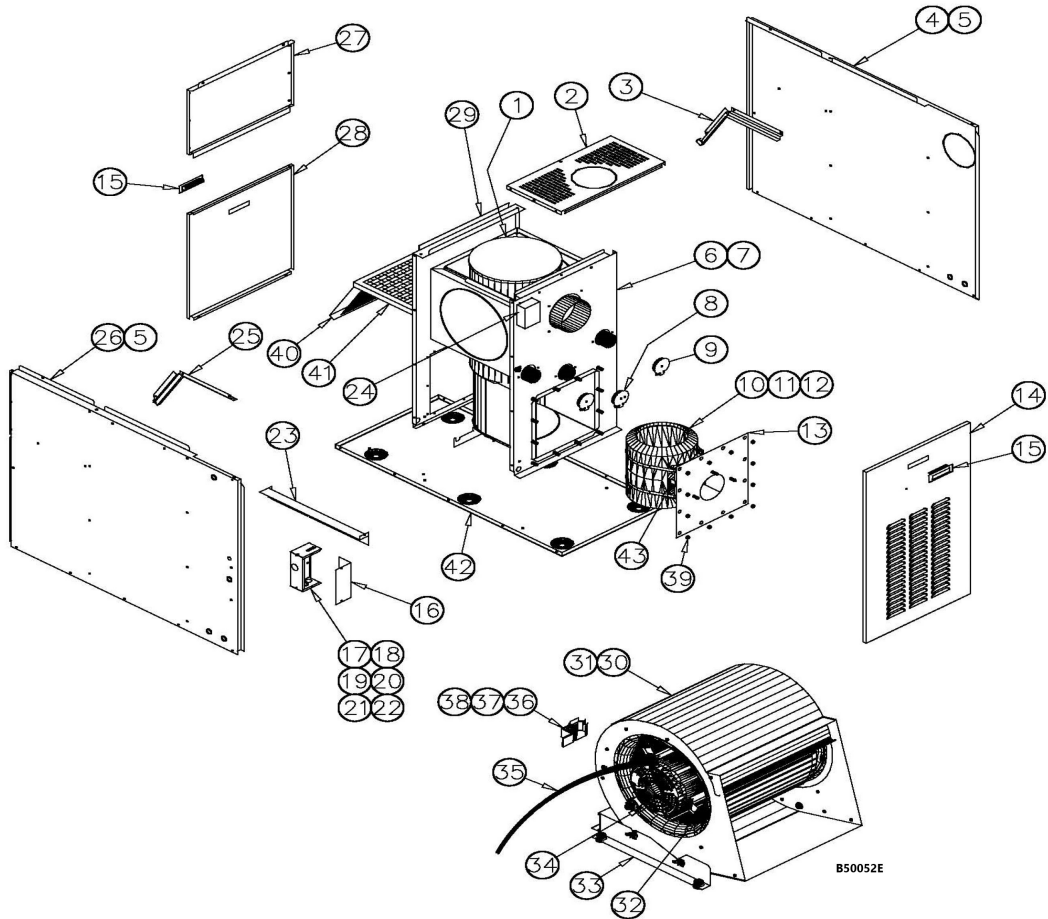


Table 11 – Replacement part list RLB-105 F

Item	Description	Part Number	Item	Description	Part Number
1	Heat exchanger	B02935-01	24	Fan limit	B04272-02
2	Front top panel	B03009-01	25	Filter rack left side	B03014-02
3	Filter rack right side	B03014-01	26	Left side panel assembly	B03017-11
4	Right side panel assembly	B03017-10	27	Rear top panel	B03008-03
5	Side panel insulation	B03016	28	Blower door	B03012-01
6	Front divider panel assembly	B03019	29	Rear divider panel assembly	B03027-01
7	Front divider panel insulation	B03018	30	Blower assembly	B02584-01
8	Observation door assembly	B02111	31	Blower 100-10T	B03720-04
9	Clean out door assembly	B01842	32	Motor support assembly	B01888
10	Burner plate assembly	B02938	33	Blower support	B03013
11	Combustion chamber	B02898	34	Motor 1/2 HP	L06H004
12	Burner plate	B02952	35	Blower, wiring harness	B02916
13	Gasket, burner plate	B02907	36	Capacitor holder	B01024
14	Front door (only)	B03011-01	37	Capacitor 7.5 MF	L01I002
15	Handle	Z99F050	38	Rubber cap capacitor	L99Z007
16	Electrical box cover	B02978	39	Hex nut 3/8-NC brass	F07O001
17	Electrical box assembly	B02977	40	Paper filter 10" x 20"	Obtain locally
18	Transformer	L01F009	41	Paper filter 12" x 20"	Obtain locally
19	Relay SPDT 24VAC	L01H009	42	Floor assembly	B03025
20	Terminal 4 buss	L05F009	43	Combustion chamber support	B02953
21	Burner wire harness	B02915		Blocked vent Shut-Off BVSO-225-A	Z06G001
22	Fan limit wire harness	B02917		Electric kit BVSO ext.	B03118-01
23	Wire conduit	B03015		Electric kit BVSO int.	B03331-01

Figure 12 – RLB-140 F

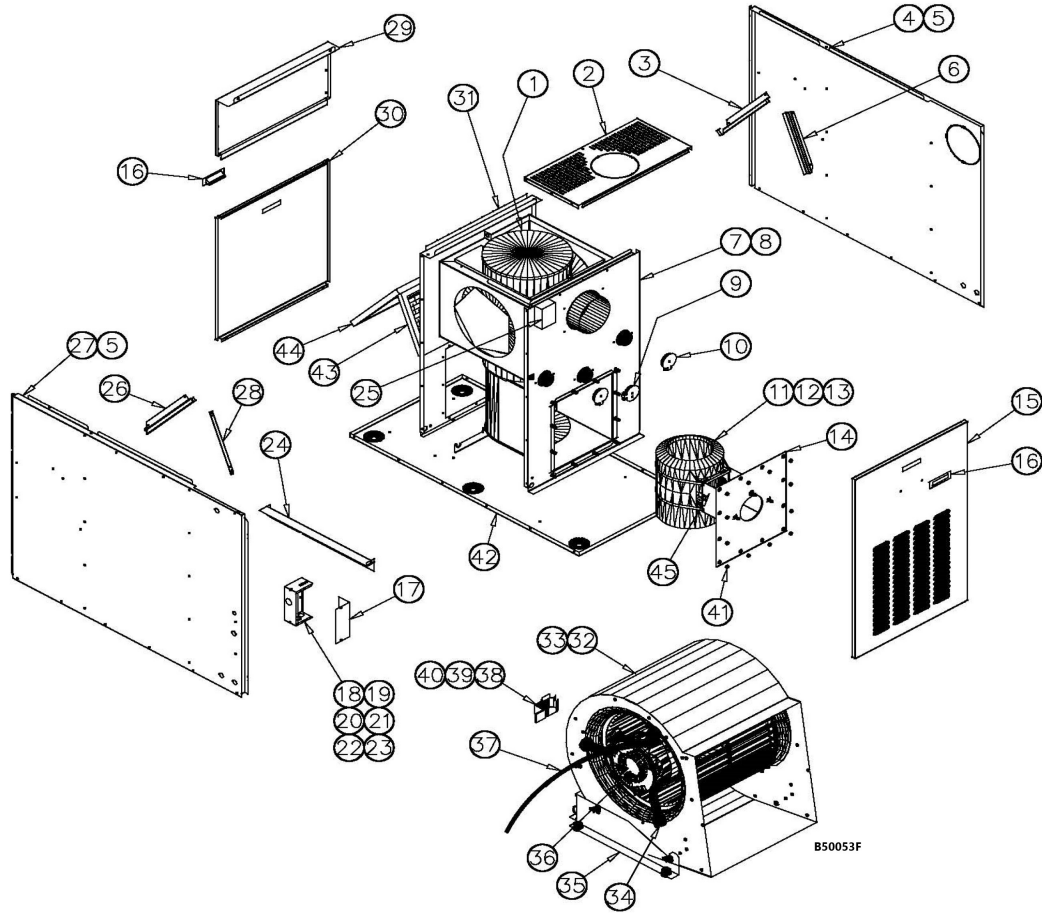


Table 12 – Replacement part list RLB-140 F

Item	Description	Part Number	Item	Description	Part Number
1	Heat exchanger	B03115-01	25	Fan limit	B04272-02
2	Front top panel	B03135-01	26	Filter rack left side	B03146-02
3	Filter rack right side	B03146-01	27	Left side panel assembly	B03162-13
4	Right side panel assembly	B03162-08	28	Filter rack left side	B03147-02
5	Side panel insulation	B03169	29	Rear top panel	B03133-04
6	Filter rack right side	B03147-01	30	Blower door	B03134-01
7	Front divider panel assembly	B03165	31	Rear divider panel assembly	B03168-01
8	Front divider panel insulation	B03170	32	Blower assembly	B02583-01
9	Observation door assembly	B02111	33	Blower 120-10T	B03720-05
10	Clean out door assembly	B01842	34	Motor support assembly	B01889
11	Burner plate assembly	B03160	35	Blower support	B03143
12	Combustion chamber	B02899	36	Motor 1 hp	L06K004
13	Burner plate	B03149	37	Blower, wiring harness	B02916
14	Gasket, burner plate	B02905	38	Capacitor holder	B01024
15	Front door (only)	B03137-01	39	Capacitor 10 MF	L01I003
16	Handle	Z99F050	40	Rubber cap capacitor	L99Z007
17	Electrical box cover	B02978	41	Hex nut 3/8-NC brass (qty 12)	F07O001
18	Electrical box assembly	B02977	42	Floor assembly	B03167
19	Transformer	L01F009	43	Paper filter 12"x24"	Obtain locally
20	Relay SPDT 24VAC	L01H009	44	Paper filter 16"x24"	Obtain locally
21	Terminal 4 buss	L05F009	45	Combustion chamber support	B03148
22	Burner wire harness	B02915		Blocked vent Shut-Off BVSO-225-A	Z06G001
23	Fan limit wire harness	B02917		Electric kit BVSO ext.	B03118-01
24	Wire conduit	B03144		Electric kit BVSO int.	B03331-01